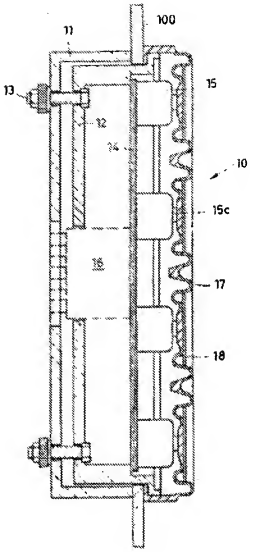
Switch arrangement having a plurality of control elements

Publication number: DE3533719
Publication date: 1987-03-26
Inventor: WILLEMS HEINZ-JUERGEN (DE); BEYER DETLEV (DE)
Applicant: RHEINMETALL GMBH (DE)
Classification:
- international: ***H01H13/70; H01H13/785;*** **H01H13/70;** (IPC1-7): H01H13/70; H01H9/04
- European: H01H13/785; H01H13/70
Application number: DE19853533719 19850921
Priority number(s): DE19853533719 19850921

Also published as:
FR2587833 (A1)
CH670917 (A5)

Abstract of **DE3533719**

A switch arrangement 10 which can be plugged together to form relatively large key panels comprises (in a showerproof housing) a printed circuit board 14 having conductor tracks 19, 19a, on which a plurality of control elements (operating elements) 15 are arranged in the form of rows and columns, which control elements 15 connect the conductor tracks 19, 19a. The switch arrangement 10 is bounded on the front side by a showerproof sealing profile 17 which covers the control elements 15. The switch arrangement 10 makes possible customer-specific assembly of key panels having different switching functions, even in the case of relatively small quantities.



Result Page

The invention relates to a switch arrangement with a majority of control elements.

Switch arrangements of this kind are needed for the most varied ranges of application, in particular also in mechanical engineering, for the manual release by machine functions.

From the state of the art well-known switch arrangements with a majority of control elements can be essentially divided in two large groups. The first group covers keyboards, which are composed of individual keys, which are provided predominantly with particular engravings of the control elements and in particular arrangement on customer's request. It concerns here switch arrangements, which can be modlizifiert also later still by the customer concerning the engravings and concerning the gear functions by blind plug and such a thing. This is necessary in nearly all applications in the machine and tool-making, since the machine user usually wishes on his particular conditions cut switch arrangement. One is problematic sufficiently humidity and dust proof sealing of the keys, without the one function reliable in service of the switch arrangements in rough Umgebungs< at this first group of the switch arrangements; DP N=5> conditions not to be guaranteed knows. When used Notlösung for the recovery of the problem often a transparent sealing compound, over all control elements and/or. Keys of the switch arrangement one stretches, and at least temporarily the troublefree actuation of the control elements ensures. On the other hand so-called transparency keyboards are well-known, which there are in different technical remarks, which however in each case to customer's request to be cut to have and then only in mass production economically to be manufactured be able. The inset of such switch arrangements is appropriate therefore usually only with machines or plants, which are invariably manufactured in relatively large series. Practice demands however switch arrangements, which let flexible adjust itself easy and also with relatively small number of items to special customer's requests. Well-known switch arrangements that managing mentioned kind cover usually in each case normally open contact contacts, which must be inverted only by means of an additional gate circuit on electronic of ways, if the function of an opener contact is to be realized. This is however, in particular in the mechanical engineering range, from safety reasons forbidden, since with a normally open contact contact the safety regulations appropriate Spannungsunterbrechung is attainable never.

The invention is the basis the task to indicate a new switch arrangement which avoids those managing mentioned disadvantages, and which, despite easy and flexible modifyable choice of the switching functions, highest working reliability in rough site conditions guarantees and, to case demanded, also highest electrical security by planning opener contacts.

This task is solved by the invention indicated in the claim 1.

Favourable arrangements and training further of the invention come out from the Unteransprüchen.

The invention is more near described in the following with reference to the design. Shows:

Fig. 1: switch arrangement installed a profile by one in a plant;

▲ top Fig. 2: a profile by parts of the switch arrangement after Fig. 1 in increased ruler;

Fig. 3: a supervision on the front side of the switch arrangement after Fig. 1.

Fig. 1 shows a profile by one in a plant installed switch arrangement 10. The switch arrangement 10 is fastened in a simple manner by means of clamping screws 13 and a pressure framework 11 in a cutout of the front plate 100 of the plant. The switch arrangement 10 covers back a splash-water-close casing 12, in which essentially parallel to the front plate 100 running conductive strips 19, 19a basic printed circuit board 14 is arranged. On the printed circuit board 14 again are line and/or. spaltenförmig several, the conductive strips 19, 19a on the printed circuit board 14 connecting, control elements 15 arranged. When 10 is finally before the control elements 15 a splash-water-close sealing profile 17 arranged frontlateral delimitation of the switch arrangement, which pulled around the bent wall of the casing 12, thereby when assembling of the switch arrangement 10 against an edge surface of the front plate 100 presses themselves and a dampproof termination of the front plate break-through in this way guarantees.

The control elements 15 are spaltenförmig arranged line or. They cover an essentially topfförmig trained casing 15a, which is embodyable by means of out-jumping fixed brackets 15b in bores of the printed circuit board 14. In a centrically arranged bore in the casing 15a is from a spring element (compression spring 15f and/or. Disc spring 15h) subjected tappet 15c slidable stored, which pushes in rest position by means of a shoulder 20 away at the internal pot soil of the casing 15a. In its tappet 15c a blind hole provided with a circularly rotating Hinterschneidung carries turned front surface for the printed circuit board 14, in which a contact element carrier 15d provided with a fixed bracket 21 intervenes. The contact element carrier 15d carries turned page of contact contacts 15g for the printed circuit board 14 by means of a smooth or tellerförmigen widening on their (see Fig. 2 down), those in rest position of the tappet 15c conductive strips 19a on that reciprocally conductive strips 19, 19a basic printed circuit board 14 electrical conductive connects and with it an electric circuit closes. It concerns thus here an opener contact, since with actuation of the tappet 15c the contact

contacts 15g stand out against the conductive strips 19a and interrupt the electric circuit. A such opener function is particularly favourable from safety considerations, since for from Befe with press controls a genuine galvanic separation of the Schalterstromkreises is attainable here. Simultaneous one carries the tappet 15c on its printed circuit board 14 likewise contact contacts 15e, which connect 14 conductive strips 19 electrical conductive arranged there after actuation of the tappet 15c with rest on the printed circuit board and fulfill thus the function of a normally open contact contact for turned front surface. The tappet 15c, within the lower range of the Fig. 2 of represented control element 15 is to a disc spring 15a subjected, which guarantees the tappet 15c in rest position, on the other hand with actuation of the tappet 15c suddenly into another situation avoids and thus a jump contact made possible. The tappet 15c in Fig. 2 of control element 15 represented above is dsgegen to a compression spring 15f subjected, against whose return force of the tappets 15c with actuation must be moved, so that a creeping contact is realized.

The putting and rest connection of the casing 15a with the printed circuit board 14 and the contact element carrier 15d with the tappet 15c secure a quick and low-priced assembly of the control element 15 and make nevertheless its replacement possible after wear and/or. Destruction, so that the switch arrangement is also particularly repair-friendly trained. The easy exchangeability of the control elements 15 makes possible it besides, even with smallest series to deal with individual customer's requests regarding the assembly with different control elements 15. Even the subsequent alteration of the switch arrangement by the customer is made possible by those managing described construction.

As frontlateral delimitation of the switch arrangement 10 a splash-water-close sealing profile 17 is arranged before the control elements 15, which is relief-like outlined. This sealing profile 17 guarantees on the one hand a splash-water-solid sealing of the switch arrangement 10, so that this can be used under roughest operating conditions reliably. Simultaneous ones provide the relief-like depressions, which can be trained essentially in a circle or squarely, for an ergonomically favorable indicator of the optimal print position for the respective actuation of the control element 15. In the depressions - easily more interchangeable - additional pressure plates 18 can be arranged, those in favourable way on their, which users turned outer surface can be provided still also on the switching function symbols referring to (Fig. 3). All conductive strips 19, 19a taken part in the gear functions lead arranged wall plug 16, which serves the switch arrangement 10 with the respective machine for the connection to one preferably centrically on the printed circuit board 19. In particularly favourable way the wall plug can be used 16 also for interconnecting several Schaltanordnungen 10 to a switch field, if it is so trained that Schaltanordnungen laterally lined up are connectable 10 by means of this wall plug 16 also in electrical regard among themselves. The switch arrangements 10 are thereby concisely in the screen line dimension together. In this way 10 in a simple manner key fields, also in relatively small series, specified after customer's request, can be created by means of a standardized switch arrangement.

To the improvement of contacting and reduction of the transition resistance the conductive strips 19, 19a are mäanderförmig in the range of the contact contacts 15g, 15e running out-arranged and there gilded, so that switching security increases. The contact contacts 15g, 15e consist particularly favourably of a conductive plastic, preferably an elastomer, thus a bouncing contacting leaves itself and/or. Contact solution with actuation of the control element 15 to a large extent exclude.

Result Page

1. Switch arrangement with a majority of control elements, characterized by the following features:

a) the switch arrangement (10) covers back a splash-water-close casing (12);
b) in the casing (12) conductive strips (19, 19a) a basic printed circuit board (14) is arranged;
c) on the printed circuit board (14) is line and/or. spaltenförmig several, the conductive strips (19, 19a) connecting control elements (15) arranged;
c) as frontlateral delimitation of the switch arrangement (10) a splash-water-close sealing profile (17) is arranged before the control elements (15).

2.Schalteranordnung according to claim 1, characterized by the following features:

a) the control element (15) covers an essentially topfförmig trained casing (15a), which is fastened by means of fixed brackets (15b) in bores of the printed circuit board (14);
b) the control element (15) covers far a tappet (15c) in a centric recess in the pot soil of the casing (15a) of the control element (15) is slidable stored and a shoulder (20) carries, by means of which it rests in rest position against the internal pot floor space of the casing (15a);
c) the tappet (15c) of the control element (15) is from a spring element (compression spring 15f and/or. Disc spring 15h) subjects, which is arranged between printed circuit board (14) and tappet (15c);
d) the tappet (15c) carries a contact element carrier (15d), which is connected by a fixed bracket (21) with the tappet (15c);
e) the contact element carrier (15d) and the tappet (15c) carry contact contacts (15g, 15e).

3. Switch arrangement after one of the claims 1 and 2, characterised in that the contact contacts (15g, 15e) of an electrical conductive plastic, preferably eimem elastomer consist.

4. Switch arrangement after one of the claims 1 to 3, characterised in that the conductive strips (19, 19a), at least trained in the range of the contact contacts (15g, 15e) mäanderförmig running and gilded there are.

5. Switch arrangement after one of the claims 1 to 4, characterised in that the operatinglateral surface of the sealing profile (17) relief-like trained is in particular circular and and/or. squarely exhibits formed depressions, whereby the indentations are arranged above the tappets (15c) of the control elements (15) in each case and to the actuation of the tappets (15c) indicates the optimal pressure point situation.

6. Switch arrangement after one of the claims 1 to 5, characterised in that in the wells of the relief-like out-arranged sealing profile (17) if necessary. Symbols basic pressure plates (18) are arranged.

7. Switch arrangement after one of the claims 1 to 6, characterised in that the cooperating conductive strips (19, 19a) and contact contacts (15g, 15e) opener and/or normally open contact contacts form.

▲ top